

## FOOTWEAR

## TECHNICAL FIELD

[0001] The present invention relates to footwear including a sole which supports a foot, and a cover which covers the instep of a foot such as an upper, and more particularly relates to sandals and highly permeable shoes which have a sole structure suitable for wearing on a sandy beach and the like.

## BACKGROUND ART

[0002] As beach sandals are used on a sandy beach and the like, sands containing water may lump up, and may attach to a bottom surface of a sole thereof, or dry sand may be piled up on a top surface of the sole. When a person goes into shallow water at a waterside or a poolside while wearing beach sandals, the person feels resistance from water more than expected, and has difficulty in walking or possibly is mired and slips. Moreover, when a person wears beach sandals on the wet feet, the bottom of the feet comes in close contact with a top surface of a sole of the sandals, and there arises a problem that the feet tend to become sweaty.

[0003] Patent Document 1 discloses getas, Japanese wooden footwear, having numerous ventilation holes passing through from a front surface to a rear surface of a geta sole, thereby providing an acupressure effect. However, these sandals and getas are mainly intended for the acupressure effect and the like, and are not examples applied to beach sandals. Even if sandals having small recesses and protrusions or holes are used on a sandy beach and the like, there still arises the problem of the adhesion of sands, and holes with a small diameter does not reclaim the problem of the resistance from water and the sweaty feet.

[0004] If a large number of holes with a small diameter as disclosed in Patent Document 1 are applied to sandals, straight holes 105 pass through a sole 103

of a sandal 101 from a top surface to a bottom surface thereof as shown in FIG. 12. Thus, when a person steps on a protruded object 107 by mistake as shown in the drawing, and the protruded object 107 fits in a hole 105, even if the sole 103 is stiff enough to prevent the protruded object 107 from entering, the protruded object 107 passes through the sole 103, and reaches the top surface of the sole 103.

[0005] The above problem of sweaty feet is particularly remarkable in shoes whose upper covers the entire instep of the foot. For example, doctors and nurses often wear shoes in the hospital, and continuously work for a long time. Their feet thus tend to become sweaty inside the shoes, and they feel quite uncomfortable.

[0006] Patent Document 1: Japanese unexamined Utility Model Publication No. H07-39501

## DISCLOSURE OF THE INVENTION

### PROBLEMS TO BE SOLVED BY THE INVENTION

[0007] The present invention is devised in view of the background art and the problems of the background art, and has an object to provide footwear such as sandals which is capable of eliminating adhesion of sands and the like, resistance from water used in the water, getting the sweaty bottom of a foot, providing an acupressure effect, preventing a protruded object from penetrating through thereof, and providing a high design effect.

### MEANS FOR SOLVING THE PROBLEMS

[0008] To solve the above problems, according to a first aspect of the present invention, there is provided footwear including a sole which supports a foot, and a cover which is attached to the sole, and covers at least a part of the instep of the foot, where the sole includes an outer frame forming the outline of the sole, and an inside member formed by combining, in an appropriate manner,

bar-like or plate-like crosspiece elements installed in the outer frame at appropriate intervals.

[0009] According to a second aspect of the present invention, there is provided the footwear according to the first aspect, where the intervals between the crosspiece elements next to each other are set to  $1/3$  to 3 times of the width of the crosspiece element.

[0010] According to a third aspect of the present invention, there is provided the footwear according to the first or second aspect, where peripheral surface shapes of the outer frame and the crosspiece elements are formed into an easily separating shape which facilitates easy separation of attached sands and the like.

[0011] According to a fourth aspect of the present invention, there is provided the footwear according to any of the first to third aspects, where a plurality of the crosspiece elements are provided at an even interval along the lengthwise direction of the sole.

[0012] According to a fifth aspect of the present invention, there is provided the footwear according to any of the first to fourth aspects, where the crosspiece elements are made of a transparent or half-transparent synthetic resin material, and the synthetic resin material contains an ingredient providing a design effect.

[0013] According to a sixth aspect of the present invention, there is provided footwear including a sole which supports a foot, and a cover which is attached to the sole, and covers the instep of the foot, where a plurality of tilted hole parts are provided aslant in the sole such that bottom openings thereof are horizontally displaced from top openings thereof.

[0014] According to a seventh aspect of the present invention, there is provided the footwear according to the sixth aspect where the diameter of the tilted hole parts is at least 3 mm.

[0015] According to an eighth aspect of the present invention, there is provided

footwear including a sole which supports a foot, and a cover which is attached to the sole, and covers at least a part of the instep of the foot, where the sole includes an outer frame forming the outline of the sole, and an inside member formed by combining, in an appropriate manner, bar-like or plate-like crosspiece elements installed in the outer frame at appropriate intervals, and opening parts delimited by the outer frame and the inside member are formed aslant such that bottom openings thereof are horizontally displaced from top openings thereof.

[0016] According to a ninth aspect of the present invention, there is provided the footwear according to any of the first to eighth aspects, where the footwear are sandals.

[0017] According to a tenth aspect of the present invention, there is provided the footwear according to any of the first to ninth aspects, where the footwear are indoor shoes.

[0018] According to an eleventh aspect of the present invention, there is provided the footwear according to the ninth aspect where ventilation holes are formed on the cover.

#### EFFECTS OF THE INVENTION

[0019] Even if sandals, which are footwear according to the present invention, are used as beach sandals on a sandy beach, adhesion of sands to the soles are largely reduced by the intervals with a large opening area formed between the crosspiece elements, and the easily separating shape of the crosspiece elements. Moreover, sands do not deposit on the top surface of the sole, and even if a person walks into the water while wearing the sandals, the sandals receive only small resistance from the water, resulting in easy walk, and thus a small possibility of tumble and the like. Moreover, even if a person wears the sandals while the feet are wet, the bottom of the feet never becomes sweaty.

If the material constituting the crosspiece elements contains an

ingredient such as beads, it is possible to add a design effect to the sandals. When tilted hole parts or opening parts formed aslant are provided in the sole, even if a person steps on a protruded object, the protruded object will not reach the top surface of the sole. Moreover, the presence of the opening parts with a large diameter reduces the raw material cost and the weight of the sandals.

Shoes, which are footwear according to the present invention, can prevent the bottom of the feet from becoming sweaty, and when tilted hole parts or opening parts formed aslant are provided on the sole, even if a person steps on a protruded object, the protruded object will not reach the top surface of the sole. Moreover, the presence of the opening parts with a large diameter reduces the raw material cost, and the weight thereof.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0020] FIG. 1 is a perspective view showing a sandal according to a first embodiment of the present invention;

FIG. 2 is a plan view of the sandal according to the first embodiment;

FIG. 3 is a side cross sectional view of the sandal according to the first embodiment;

FIG. 4 is a perspective view showing a sandal according to a second embodiment;

FIG. 5(a) is a side cross sectional view, and FIG. 5(b) is a partially enlarged cross sectional view showing the sandal according to the second embodiment;

FIG. 6 is a perspective view showing a sandal according to a third embodiment;

FIG. 7(a) is a side cross sectional view, and FIG. 7(b) is a partially enlarged cross sectional view showing the sandal according to the third embodiment;

FIG. 8 is a plan view showing variations different in shape and

arrangement of crosspiece elements of the sandals according to the first and third embodiments;

FIG. 9 is a cross sectional view showing variations of an easily separating shape applied to the outer frame and the crosspiece elements of the sandals according to the first and third embodiments;

FIG. 10 is a perspective view showing a shoe according to a fourth embodiment;

FIG. 11(a) is a side cross sectional view, and FIG. 11(b) is a partially enlarged cross sectional view showing the shoe according to the fourth embodiment; and

FIG. 12 is a side cross sectional view showing a problem of holes formed in a sandal.

#### BEST MODE FOR CARRYING OUT THE INVENTION

[0021] A description will now be given of first to third illustrated embodiments.

FIG. 1 is a perspective view showing a sandal according to the first embodiment, and FIG. 2 is a plan view of the sandal according to the first embodiment. FIG. 3 is a side cross sectional view of the sandal according to the first embodiment. FIG. 4 is a perspective view showing a sandal according to the second embodiment, and FIG. 5(a) is a side cross sectional view and FIG. 5(b) is a partially enlarged cross sectional view showing the sandal according to the second embodiment. FIG. 6 is a perspective view showing a sandal according to the third embodiment, and FIG. 7(a) is a side cross sectional view and FIG. 7(b) is a partially enlarged cross sectional view showing the sandal according to the third embodiment. FIG. 8 is a plan view showing variations different in shape and arrangement of crosspiece elements of the sandals according to the first and third embodiments. FIG. 9 is a cross sectional view showing variations of an easily separating shape applied to an outer frame and the crosspiece elements of the sandals according to the first and third

embodiments. FIG. 10 is a perspective view showing a shoe according to the fourth embodiment, and FIG. 11(a) is a side cross sectional view and FIG. 11(b) is a partially enlarged cross sectional view showing the shoe according to the fourth embodiment.

[0022] A sandal 1 which is footwear according to the first embodiment is constructed by attaching an upper 5 or a thong 7 as a cover, which covers the instep of a foot, to a sole 3, which supports the foot. Materials having proper elasticity and rigidity such as rigid urethane or synthetic rubber may be used for the sole 3, and more rigid wood or other rigid plastic material may also be used. According to the present embodiment, a transparent or half-transparent synthetic resin material is used as the material of the sole 3. The material includes beads 17 in various colors dispersed therein as an example of an ingredient providing a design effect.

It should be noted that the above description also applies to the second and third embodiments described later.

[0023] The sole 3 includes an outer frame 9 forming the outline thereof, and an inside member 15 formed by combining, in an appropriate manner, bar-like or plate-like crosspiece elements 13 installed in the outer frame 9 at appropriate intervals 11. The outer frame 9 and the crosspiece elements 13 are not necessarily solid, and may be hollow.

The outer frame 9 is formed into a curved shape corresponding to the shape of the foot, thereby constituting a contour of the sole 3. In the outer frame 9 are provided five crosspiece elements 13 at an equal interval along the lengthwise direction (left/right direction in FIG. 2) of the sole 3.

[0024] The dimension C of the interval 11 between the neighboring crosspiece elements 13 is relatively wide, and is set to a range from 1/3 to 3 times of the width dimension B of the crosspiece element 13. This configuration prevents sands A from attaching from the bottom surface side of the sole 3, and promoting discharge of the sands A which have entered from the top surface

side of the sole 3.

Moreover, the peripheral surfaces of the outer frame 9 and the crosspiece elements 13 are formed into easily separating shapes which promote separation and removal of the attached sands A. According to the present embodiment, the outer frame 9 and the crosspiece elements 13 are formed into an oblong circle shape as an example of the easily separating shape.

[0025] Attached to the sole 3 configured in this way are the upper 5 indicated by phantom lines in FIG. 1 or the thong 7 indicated by solid lines in FIG. 1, resulting in the sandal 1. Employed as the upper 5 may be one which completely covers the instep of the foot as well as one configured so as not to cover a part of the instep such as toes or the like.

The thong 7 and the upper 5 may be combined together. The upper 5 may be obtained by meshing multiple upper elements in a webbing form.

[0026] A sandal 21 as footwear according to the second embodiment is different from the first embodiment in configuration of the sole 3. Namely, though the sole 3 is formed as an approximately flat plate as ordinary sandal, multiple tilted hole parts 27 are provided aslant in the sole 3 such that bottom openings 23 thereof are horizontally displaced from top openings 25 thereof as shown in FIGS. 4 and 5.

Moreover, the bore diameter D of the tilted hole parts 27 is relatively large, and is set to 3 mm or more, preferably 5 mm or more.

[0027] By providing these tilted hole parts 27, even if a protruded object 29 enters from the bottom opening 23 into the tilted hole part 27 as shown in the enlarged view in FIG. 5(b), more entrance thereof is prevented by a tilted inner wall surface of the tilted hole part 27, thereby preventing the protruded object 29 from penetrating through the top opening 25 to the top surface of the sole 3.

Moreover, by setting the bore diameter D of the tilted hole parts 27 relatively large, the sands A are prevented from attaching, the ventilation is secured, and the resistance from water in the water is reduced, in addition to



the above-mentioned effect.

[0028] A sandal 31 as footwear according to the third embodiment has a configuration obtained by combining the configuration of the sandal 1 according to the first embodiment in combination with the configuration of the sandal 21 according to the second embodiment, and the configuration of the sole 3 thereof is different from the first and second embodiments. The sole 3 includes the outer frame 9 forming the outline thereof, and the inside member 15 formed by combining, in an appropriate manner, bar-like or plate-like crosspiece elements 13 installed in the outer frame 9 at appropriate intervals 11 as shown in FIGS. 6 and 7 as the first embodiment.

However, the configuration of the opening parts 33 partitioned by the outer frame 9 and the inside member 15 is different from the first embodiment, and the opening parts 33 employ the configuration of the tilted hole parts 27 employed in the second embodiment.

[0029] Namely, the crosspiece elements 13 more or less tilted with respect to the longitudinal axis thereof are attached to the outer frame 9 inside the outer frame 9.

With this configuration, the opening parts 33 are formed aslant so that the bottom openings 23 thereof are horizontally displaced from the top openings 25 thereof.

With this configuration, the protruded object 29 is also prevented from penetrating to the top surface of the sole 3 as shown in the enlarged view of FIG. 7(b) as in the second embodiment.

[0030] A description will now be given of a shoe 41 as footwear according to the fourth embodiment.

The shoe 41 is an indoor type shoe worn by doctors and nurses in the hospital, and includes a sole 42 and an upper 43 as a cover attached to the sole 42.

Multiple tilted hole parts 45 are formed in the sole 42, and the tilted

hole parts 45 are formed aslant so that the bottom openings 47 thereof are horizontally displaced from the top openings 49 thereof.

Moreover, a number of ventilation holes 51 are formed on the upper 43.  
[0031] Since the tilted hole parts 45 and ventilation holes 51 are formed on this shoe 41, the air smoothly communicates therein. The sweaty feet can thus be prevented.

Since the tilted hole parts 45 are formed aslant such that the bottom openings 47 are horizontally displaced from the top openings 49, a protruded object is prevented from penetrating to the top surface of the sole 42 as in the second and third embodiments.

[0032] Though the description has been given of the best modes for carrying out the present invention and the embodiments thereof, specific configuration are not limited to these modes and embodiments, and the present invention includes changes in the design within a scope without departing from the gist of the present invention.

For example, the shape and arrangement of the crosspiece elements 13 are not respectively limited to the linear shape and the crossbar arrangement according to the first and third embodiments as shown in FIGS. 1, 2, and 6, and the crosspiece elements 13 in a curved shape may be used to provide arrangements taking after various designs as shown in FIGS 8(a) and 8(b). With this configuration, three-dimensional designs and the like can be provided for sandals, which tend to be designed two-dimensionally, resulting in an increased design effect.

[0033] Moreover, in the first and third embodiments, the easily-separating shapes provided for the outer frame 9 and the crosspiece elements 13 may be an ellipsis as shown in FIG. 9(a), a rectangle with rounded corners as shown in FIG. 9(b), a shape like a plant leaf as shown in FIG. 9(c), and a lozenge as shown in FIG. 9(d) as well as the oblong circle as described above.

Further, the ingredient scattered in the material of the sole 3 may be

fractions of seashells, pebbles and sands, scales of fishes, flakes of colored paper (including ones made of soft vinyl), flakes of gold foil and aluminum foil, flakes of reflection tapes, artificial flowers, liquid such as colored oil, and other various materials as well as the beads 17.

Though the tilted hole parts 45 of the shoe 41 according to the fourth embodiment have a round hole shape with the bottom opening 47 horizontally displaced from the top opening 49, the sole of the shoe may be formed by combining, in an appropriate manner, an outer frame forming the outline thereof, and bar-like or plate-like crosspiece elements installed in the outer frame at appropriate intervals as the sole of the sandals according to the first and the third embodiments.

Moreover, when a sole of a sandal or a shoe is formed by combining, in an appropriate manner, an outer frame forming the outline thereof, and bar-like or plate-like crosspiece elements installed in the outer frame at appropriate intervals, at least one rib which connects parts of the outer periphery with each other, connects the outer frame and the crosspiece element with each other, or connects the crosspiece elements with each other may be provided in order to increase the strength of the sole.

The shoe is not limited to indoor shoes, and the present invention can apparently be applied to shoes worn outdoors.